The presentation will begin at noon.

There will be no audio until the presentation begins.

Vaccinating High Risk Patients

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Outline

- Overview
- Precautions vs. contraindications
- Vaccinations commonly recommended for people with high risk conditions
- Specific vaccine recommendations by condition
- Commonly asked questions

Resources

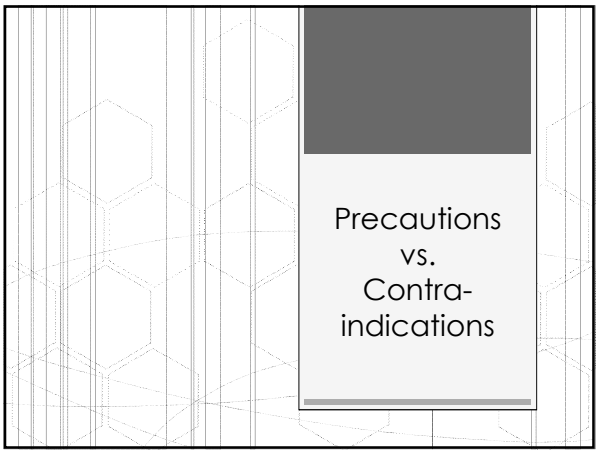
- MMWR: General Recommendations on Immunization. http://www.cdc.gov/mmwr/pdf/rr/rr6002.pdf
- MMWR: PCV13 use in Adults. http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6140a4.htm
- MMWR: Control and Prevention of Meningococcal Disease. http://www.cdc.gov/mmwr/preview/mmwrhtml/rr6202a1.htm
- Pink Book.
- Immunization Action Coalition (IAC) immunize.org.

Vaccination Schedules

- Can sometimes be very complicated.
- Some recommendations may differ or contain old practices.
- Certain vaccines are not licensed for use in these populations.
- High risk conditions are not seen frequently.
- ACIP sometimes differs from the package insert.

Why is vaccination so important in these patients?

- Higher risk for complications including hospitalization and death.
- Potentially close contact to other people with high risk conditions (hospital, chemotherapy).
- Infections could increase severity of primary health problem.



Precautions

- Precaution: A condition in a recipient that ***might increase*** the chance or severity of a serious adverse reaction, or that might compromise the ability of the vaccine to produce immunity.
  - Vaccines may be deferred but given at a later date.
  - Temporary precautions (all vaccines) include moderate to severe acute illness and recent receipt of antibody-containing blood products (for live vaccines).
  - Permanent precautions to further pertussis-containing vaccine are temperature of 105° F within 48 hours of a dose, collapse or shock-like state within 48 hours of a dose, persistent inconsolable crying lasting 3 or more hours occurring within 48 hours of a dose or a seizure occurring within 3 days of a dose.

Contraindications

- Contraindication: A condition in a recipient that *greatly increases* the chance of a serious adverse reaction.
  - Vaccines will generally not be given if present.
  - Few true contraindication conditions.
  - 2 temporary conditions (live vaccines only)
    - Pregnancy
    - Immunosuppression
  - 2 permanent conditions
    - Severe anaphylactic allergic reaction to a vaccine component or following a prior dose of vaccine.
    - Encephalopathy not due to another identifiable cause occurring within 7 days of pertussis vaccination.

Vaccines Commonly Recommended for High Risk Conditions

Vaccine Recommendations

- Does not include all adult immunizations or conditions where additional immunizations are recommended.
- Tdap is recommended for all adults who are not contraindicated. Especially for adults who have contact with small children.
- Other catch-up recommendations for MMR, Hep A, Hep B, Varicella….

Vaccines Commonly Recommended

- Hib
  - Pediatric formulation.
- Meningococcal
  - MCV4
    - Menactra: 9 months -55 years.
    - Menveo: 11-55 years.
  - MPSV4
    - Menommune: 2 years and older.
      - Only use for individuals 56 years and older.

Vaccines Commonly Recommended

- Pneumococcal
  - PCV13: 6 weeks and older.
    - Adult recommendations recently added.
  - PPSV23: 2 years and older.
    - Administered to high risk individuals and sometimes given along with PCV13 for certain conditions.
    - Should not receive a booster every 5 years. Two doses at most.
- Inactivated Influenza
  - People with high risk conditions should not receive the live, attenuated influenza vaccine.

Indications for Adult Use of PCV13

- Immunocompetent: CSF leak, cochlear implant.
- Persons with functional or anatomic asplenia.
- Immunocompromised persons: HIV, renal failure, leukemia, organ transplant, cognitive or acquired immunodeficiencies.
  - Not an exhaustive list.

Pneumococcal Algorithm

- PPSV23 first: Give PCV13 dose at least one year after PPSV23.
  - Only for those indicated to receive PCV13 as an adult.
  - Additional doses of PPSV23 should be given no sooner than eight weeks after PCV13 and at least five years since previous PPSV23.
  - Example: 27 year old HIV positive patient.
    - PPSV23 administered 05/01/2008
    - PCV13 administered today (08/14/2013)
    - Second PPSV23 cannot be given before 10/09/2013 (8 weeks later). Also meets the five year mark for PPSV23.

Pneumococcal Algorithm

- Pneumococcal vaccine-naïve: Person who has never received a pneumo vaccine.
  - Only for those indicated to receive PCV13 as an adult.
  - Patient should receive one dose of PCV13 now, a dose of PPSV23 at least eight weeks later.
  - Follow routine recommendations for a booster dose of PPSV23.

Vaccines Commonly Recommended

- Live vaccines are often contraindicated for individuals who have compromised immune systems.
- A health care provider should assess each patient on a case by case basis to determine whether they are healthy enough to receive live vaccines.

Vaccine Schedule by High Risk Condition

Hematopoietic Stem Cell Transplant (HCT)

- Antibody titers to vaccine-preventable diseases decrease 1-4 years after HCT if not revaccinated.
- These patients are at particular risk for encapsulated bacterial infections (i.e. pneumococcal, meningococcal and Hib infections).
- Vaccination should not start until 6 months following transplant.
  - In some circumstances can be as early as 3-4 months after.

HCT Recommendations – Inactivated Vaccines

Vaccine	Number of Doses	Spacing
Inactivated Influenza	One, annually	If given within 6 months following HCT an additional dose should be considered.
PCV13	Three	At least 1 month in between doses.
PPSV23	One	Following PCV13 series by at least 8 weeks.
Hib*	Three	At least one month in between doses.

*Regardless of prior vaccination.

HCT Recommendations – Live Vaccines

Vaccine	Number of Doses	Spacing
MMR	Two	Administered at least 24 months post HCT.
Varicella	Two	Administered at least 24 months post HCT.

- Live vaccines should only be administered if the patient is immunocompetent.
- Because there is insufficient experience using varicella vaccine in HCT recipients health care providers should assess the immune status of each recipient on a case by case basis and determine the risk for infection before vaccinating.

Use of High-Dose Corticosteroids

- Considered high dose:
  - ≥2 mg/kg of body weight or ≥20 mg/day of prednisone or equivalent for persons who weigh ≥ 10 kg when administered for longer than 14 days.
- If dose is higher than listed above consider deferring live vaccines for at least 1 month after discontinuation of high dose treatment.
- Vaccination with inactivated vaccines is not a precaution and should be administered if recommended.

Acceptable Dosages of Corticosteroids

- Live vaccines do not need to be deferred if:
  - Short term therapy (less than 14 days).
  - Less than 20 mg per day.
  - Long-term alternate day therapy with short-acting preparations.
  - Maintenance physiological doses (replacement therapy).
  - Topical, inhaled or by intraarticular, bursal, or tendon injection.

Chemotherapy

- Patients receiving chemotherapy and/or radiation should be considered immunocompromised.
- Live vaccines should not be administered for at least 3 months following these types of therapy.
- Inactivated vaccines administered during chemotherapy should be readministered after immune competence is regained.
- Revaccination of a person following chemotherapy is considered unnecessary if the previous vaccination occurred before therapy began and not during.
  - Exception would be HCT patients (discussed previously).

Asplenia

- People with either anatomic (i.e., removal of spleen) or functional (i.e., sickle cell disease) asplenia are at particular risk for encapsulated bacterial infections (i.e. pneumococcal, meningococcal and Hib infections).
- Vaccinations should be given at least 14 days prior to a splenectomy, if possible. If vaccinations are not given before surgery, they should be administered after the procedure as soon as the patient is stable.
- All immunization recommendations can be found on next slide.
- Children with asplenia should be vaccinated age appropriately.

Asplenia Recommendations – Inactivated Vaccines

Vaccine	Number of Doses	Spacing
Inactivated Influenza	One, annually	Follow routine recommendations.
PCV13	One	Given first.
PPSV23	One	Administer at least eight weeks after PCV13 and booster after five years.
Hib	One	Not necessary if previously vaccinated.
Meningococcal (use MCV4 for those under 55 years of age)	Two doses with boosters	Two doses 8-12 weeks apart with a booster every five years.

HIV Infection

- All immunization recommendations are subject to health care provider's opinion on immune status.
- LAIV is contraindicated in an individual who is HIV positive.
- MMR and Varicella should not be administered if the individual is immunocompromised.
- There is no routine MCV4 recommendation for people with HIV however the if person if recommended vaccination MCV4 should be administered.

HIV Recommendations – Inactivated Vaccines

Vaccine	Number of Doses	Spacing
Inactivated Influenza	One, annually	Follow routine recommendations.
PCV13	One	Given first.
PPSV23	One	Administer at least eight weeks after PCV13 and booster after five years.
Hib	One	Not necessary if previously vaccinated.
Meningococcal (use MCV4 for those under 55 years of age)	Two doses with boosters	Two doses 8-12 weeks apart with a booster every five years.

Vaccinating Patients with Bleeding Disorders

- There is a risk for a hematoma formation after intramuscular injections.
- When a vaccine is recommended to be given intramuscularly a health care provider who is familiar with the patient's bleeding disorder should determine whether this vaccine can be given safely.
- If the patient receives antihemophilia therapy the vaccine can be given shortly after the therapy is administered.
- Also consider using a fine gauge (23 gauge or smaller) followed by firm pressure without rubbing for 2 minutes.
- Patients receiving anticoagulation therapy should be treated following the same guidelines.

Vaccinating Pre-Term Infants

- In the majority of cases infants born prior to 37 weeks gestation, regardless of birth weight, should be vaccinated following the routine immunization schedule at the same chronological age as non-premature infants.
- Hepatitis B is the only exception. If the birth dose of Hep B is given to an infant weighing < 2,000 grams the dose should not be counted in the series and should be repeated once the child weighs > 2,000 grams and is 1 month old.
- Dose should still be given at birth regardless of weight. This is done to protect the baby from maternal transmission of Hep B.

Vaccination Following a Mastectomy

- Theoretically IM injections can still be given to individuals who have had a mastectomy and lymph nodes removed.
- Health care providers should consider administering immunizations in the thigh or gluteal muscle. This should only be done by a health care provider who knows how to administer correctly to adults in these areas.

Diabetic Patients

Vaccine	Number of Doses	Spacing
Hepatitis B	Three	O,1-2, 6 months. For adults 19-59 it is a routine recommendation, those over 60 should consult with their health care provider.
PPSV23	Two	< 65 years of age should receive one dose and then a booster after 65 years of age with at least 5 years since last dose.

Common Questions

Live Vaccines and TB Skin Testing (TST)

- MMR vaccine may cause a false negative result for TB skin testing.
- TST and MMR can be done at the same visit but if not given on the same day:
  - Vaccine First: TST screening should be delayed for at least 4 weeks after vaccination.
  - TST First: You may administer MMR vaccine after the TST has been read and determined positive or negative.
- If patient is positive for TB the MMR may be deferred until their immune status can be determined.

Breast Feeding and Vaccination

- Neither inactivated nor live virus vaccines administered to a lactating woman affect the safety of breastfeeding for women or their infants.
  - Virus is not passed in breast milk.
- Breast feeding mothers should not receive smallpox vaccine.
  - Vaccine not currently available to the public.
- Yellow fever vaccine should be avoided in breast feeding mothers, however if they are traveling to high risk areas these women should be vaccinated.
  - Risk of infection higher than theoretical risk of transmission via breast milk.

Live Vaccines and Immunocompromised Contacts

- Live vaccines CAN and SHOULD be given to household contacts of immunocompromised people or pregnant women.
- This protects the high risk household contact from being exposed to a potentially serious or fatal illness.
- The only exception would be individuals who care for someone who is so immunologically challenged that they must live in a protective environment.
  - Regular contacts to this type of patient should not receive live attenuated influenza vaccine.
    - Can still receive MMR and varicella.

Antibiotics and Immunizations

- The only time an antibiotic would interfere with the immune response to a vaccine is in the case of live, oral typhoid vaccine.
  - Important to consider for patients traveling abroad for those getting the oral typhoid vaccine and taking anti-malarial medications prior to departure.
  - Consider injectable typhoid vaccine
  - Vaccine first: If feasible, antibacterial drugs should not be started or resumed until 1 week after last oral vaccine dose.
  - Antibiotics first: Do no administer oral vaccine until 24 hours since last antibiotic dose.

Antivirals and Live Vaccines

- Antivirals do not interfere with inactivated vaccines.
- No data exists to suggest that commonly used antiviral drugs have an effect on rotavirus or MMR vaccines.
- Live attenuated influenza, chickenpox and shingles vaccine should not be administered while patients are on certain antivirals.

Antivirals and Live Vaccines (Influenza)

- Influenza antivirals and live attenuated influenza vaccine can counteract each other.
- Vaccine First: If feasible, antivirals should not be started for 14 days after vaccine administration.
- Influenza Antivirals First: Live, attenuated influenza vaccine should not be administered for at least 48 hours after cessation of influenza antivirals.

Antivirals and Live Vaccines (Varicella)

- Antiviral drugs active against herpesviruses (acyclovir or valacyclovir) might reduce the efficacy of varicella and zoster vaccines.
- Vaccine First: Delay use or resumption of antiviral therapy for 14 days after vaccination.
- Antiviral First: Medication should be discontinued at least 24 hours before administration of varicella or zoster vaccine.

Vaccines and Antibody-Containing Products

TABLE 5. Recommended intervals between administration of antibody-containing products and measles- or varicella-containing vaccine, by product and indication for vaccination

Product/Indication	Dose (mg IgG/kg) and route*	Recommended interval before measles- or varicella-containing vaccine† administration (months)
Tetanus IG	250 units (10 mg IgG/kg) IM	3
Hepatitis A IG		
Contact prophylaxis	0.02 mL/kg (3.3 mg IgG/kg) IM	3
International travel	0.06 mL/kg (10 mg IgG/kg) IM	3
Hepatitis B IG	0.06 mL/kg (10 mg IgG/kg) IM	3
Rabies IG	20 IU/kg (22 mg IgG/kg) IM	4
Varicella IG	125 units/10 kg (80–200 mg IgG/kg) IM, maximum 625 units	5
Measles prophylaxis IG		
Standard (i.e., nonimmunocompromised) contact	0.25 mL/kg (40 mg IgG/kg) IM	5
Immunocompromised contact	0.50 mL/kg (80 mg IgG/kg) IM	6
Blood transfusion		
RBCs, washed	10 mL/kg, negligible IgG/kg IV	None
RBCs, adenine-saline added	10 mL/kg (10 mg IgG/kg) IV	3
Packed RBCs (hematocrit 65%)§	10 mL/kg (60 mg IgG/kg) IV	6
Whole blood (hematocrit 35%–50%)§	10 mL/kg (80–100 mg IgG/kg) IV	6
Plasma/platelet products	10 mL/kg (160 mg IgG/kg) IV	7
Cytomegalovirus IGIV	150 mg/kg maximum	6
IGIV		
Replacement therapy for immune deficiencies¶	300–400 mg/kg IV¶	8
Immune thrombocytopenic purpura treatment	400 mg/kg IV	8
Postexposure varicella prophylaxis**	400 mg/kg IV	8
Immune thrombocytopenic purpura treatment	1000 mg/kg IV	10
Kawasaki disease	2 g/kg IV	11
Monoclonal antibody to respiratory syncytial virus F protein (Synagis [MedImmune])††	15 mg/kg IM	None

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